UNIVERSITY OF GONDAR

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

DEPARTMENT OF BIOLOGY

In-vitro antibacterial effect *of Malva parviflora* Linn (Malvaceae) leaf extract against Gram positive and Gram negative Bacteria

A thesis submitted to the Department of Biology, College of Natural and Computational Sciences, University of Gondar in partial fulfillment of the requirements for the degree of Master of Sciences in Applied Microbiology.

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Full title of the research project	*In-vitro* antibacterial effect *of Malva parviflora* Linn (Malvaceae) leaves against Gram positive and Gram negative bacteria.

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List of Abbreviations

ATCC	American Type Culture Collection
Cox-1	Cyclooxygenase-1
MBC	Minimum Bactericidal Concentration
MIC	Minimum Inhibitory Concentration
MRSA	Methicillin Resistant *Staphylococcus aureus*
PDR	Pan Drug-Resistant
QC	Quality Control
SD	Standard Deviation
SOPs	Standard Operating Procedures
SSTI	Skin and Soft Tissue Infections
TM	Traditional Medicine
US	United States
WHO	World Health Organization
XDR	Extensively Drug-Resistant

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Abstract

Malva parviflora L. is widely used in traditional and modern medicine for so many treatments. The methanol extracts of *Malva parviflora* also possessed expression activity against Gram-positive and Gram- negative bacteria. The objective of this research was to assess the antibacterial effect of *Malva parviflora* Linn leaf extract against gram positive and gram negative bacteria. The study was conducted in North Gondar Zone, Ethiopia from March 2016-June 2016. *M. parviflora* leaf samples were collected, identified and confirmed by senior experts. The antimicrobial susceptibility test was done for standard bacterial strains. The antibacterial activities of the methanol, chloroform and water extracts of *M. parviflora* leaf was determined. The minimum inhibitory concentration and minimum bactericidal concentration of all extracts of *M. parviflora* leaf was also determined. $P < 0.05$ was considered as statistically significant. Among the organic solvents, water extract was found to have the highest significant activity against *S. dysentery* ATCC 9889 followed by methanol extract whose inhibition zone was in the range of 10.8 mm to 13.5 mm. The chloroform extract was found effective only against *E. coli* ATCC 25922 and *P. aeroginosa* ATCC 27853. On the other hand, over 90% of the tested strains showed susceptibility to Norfloxacin, Ciprofloxacin and Chloramphenicol. Methanol extract of *M. parviflora* leave showed MIC and MBC of 100mg/ml and 150mg/ml against *S.pneumoniae* ATCC 477497, respectively. Water extract of *M. parviflora* showed MIC of 25mg/ml and MBC of 50mg/ml against *S.aureus* ATCC 25923 and *S. pyogens* ATCC 265961. The result showed that *M. parviflora* has antibacterial property which varies with the type of solvent used for extraction. Extraction Fractionation of the active ingredients is recommended.

Keywords: Antibacterial effect, *Malva parviflora*, Minimum bactericidal concentration, Minimum inhibitory concentration.